7” WVGA

High brightness color TFT-LCD module

Model: VM07B2 V1

Date: Dec. 20th, 2022

Note: This specification is subject to change without notice

Customer： _____ **Date：** _____

Approved	**Prepared**
Date:	**Date:**

Contents

RECORD OF REVISION

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<tr><td></td><td>9</td><td>LED current:360 mA
LED lifetime:40000hr</td><td>LED current:240 mA
LED lifetime:50000hr</td><td></td></tr>
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<tr><td></td><td>9</td><td>MTBF: 50K Hrs (typ.)
3.3.4. LED Driver Condition
Parameter | Symbol | Min. | Typ. | Max. | Unit | Remake
LED current | I_{LED} | | 240 | | mA |
LED voltage | V_{LED} | | 9.9 | | V |
LED lifetime | - | | 50,000 | - | Hr | Note 1
Note 1. Brightness to be decreased to 50% of the initial value.</td><td>MTBF: 100K Hrs (min)
3.3.4. LED Driver Condition
Parameter | Symbol | Min. | Typ. | Max. | Unit | Remake
LED current | I_{LED} | | 100 | | mA |
LED voltage | V_{LED} | | 18 | | V |
LED lifetime | - | 100,000 | | - | Hr | Note 1
Note 1. Brightness to be decreased to 50% of the initial value.</td><td></td></tr>
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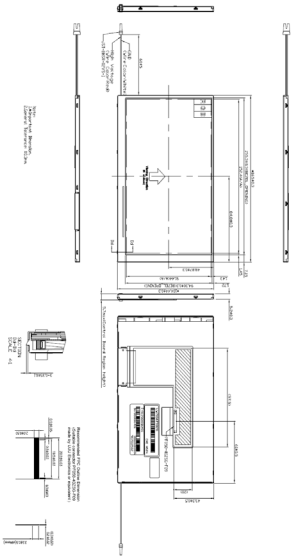
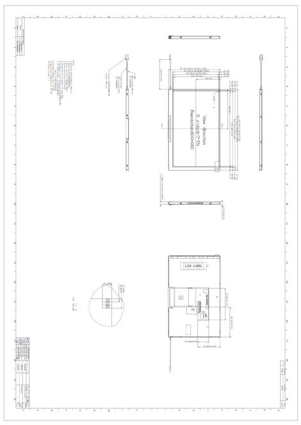
<tr><td></td><td>16</td><td>  </td><td>  </td><td></td></tr>
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1.General Specifications

No.	Item	Specification	Remark
1	LCD size	7.0 inch(Diagonal)	
2	Driver element	a-Si TFT active matrix	
3	Resolution	800 × 3(RGB) × 480	
4	Display mode	Normally White, Transmissive	
5	Dot pitch	63.5(W) × 190.5(H) um	
6	Active area	152.4(W) × 91.44(H) mm	
7	Module size	165 (W) × 104.44(H) × 5.2(D) mm	Note 1
8	Surface treatment	Anti-Glare	
9	Color arrangement	RGB-stripe	
10	Interface	TTL	
11	Backlight power consumption	1.8W (Typ.)	
12	Panel power consumption	0.66W (Typ.)	
13	Weight	TBD(Typ.)	

Note 1: Refer to Mechanical Drawing.

2. Pin Assignment

2.1. TFT LCD Panel Driving Section

1. FPC Connector is used for the module electronics interface. The recommended model is PF050-40ZSG-F09-S manufactured by UJU.
2. LED Light Bar Connector is used for the integral backlight system. The recommended model is BHSR-02VS-1 manufactured by JST.

Pin No	Symbol	Description	Remark
1	GND	Power Ground	
2	GND	Power Ground	
3	NC	Not Connect	
4	VCC	Power Supply for Digital Circuit	
5	VCC	Power Supply for Digital Circuit	
6	VCC	Power Supply for Digital Circuit	
7	VCC	Power Supply for Digital Circuit	
8	NC	Not Connect	
9	DE	Data Enable	
10	GND	Power Ground	
11	GND	Power Ground	
12	GND	Power Ground	
13	B5	Blue data 5 (MSB)	
14	B4	Blue data 4	
15	B3	Blue data 3	
16	GND	Power Ground	
17	B2	Blue data 2	
18	B1	Blue data 1	
19	B0	Blue data 0 (LSB)	
20	GND	Power Ground	
21	G5	Green data 5 (MSB)	
22	G4	Green data 4	
23	G3	Green data 3	
24	GND	Power Ground	

25	G2	Green data 2	
26	G1	Green data 1	
27	G0	Green data 0 (LSB)	
28	GND	Power Ground	
29	R5	Red data 5 (MSB)	
30	R4	Red data 4	
31	R3	Red data 3	
32	GND	Power Ground	
33	R2	Red data 2	
34	R1	Red data 1	
35	R0	Red data 0 (LSB)	
36	GND	Power Ground	
37	GND	Power Ground	
38	DCLK	Clock Signals ;Latch Data at the Falling Edge	
39	GND	Power Ground	
40	GND	Power Ground	

2.2. Backlight Unit Section

Pin No.	Symbol	I/O	Function	Remark
1	V_{LED+}	P	Power for LED backlight anode	Red
2	V_{LED-}	P	Power for LED backlight cathode	Black

3. Operation Specifications

3.1. Absolute Maximum Rating(GND=0V)

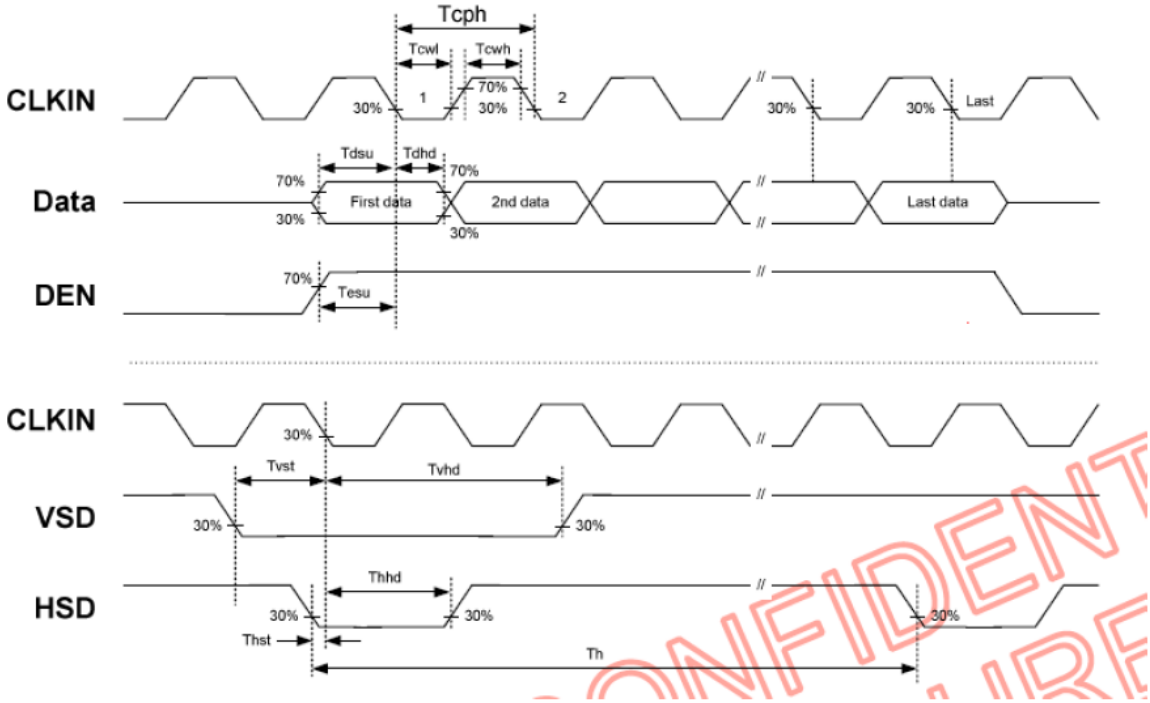
Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Voltage	Vcc	GND=0	0.3	6	V	-

3.2 Recommended Operation condition (GND=0V，Ta=25℃)

Parameter		Symbol	Rating			Unit	Condition
			Min.	Typ.	Max.		
Power Supply Voltage		Vcc	3.0	3.3	3.6	V	
Input logic voltage	High Level	V_{IH}	0.7Vcc	-	Vcc	V	Note 1
	Low Level	V_{IL}	0	-	0.3Vcc	V	Note 1

Note 1: DCLK, DE, R0~ R5, G0~ G5, B0~ B5.

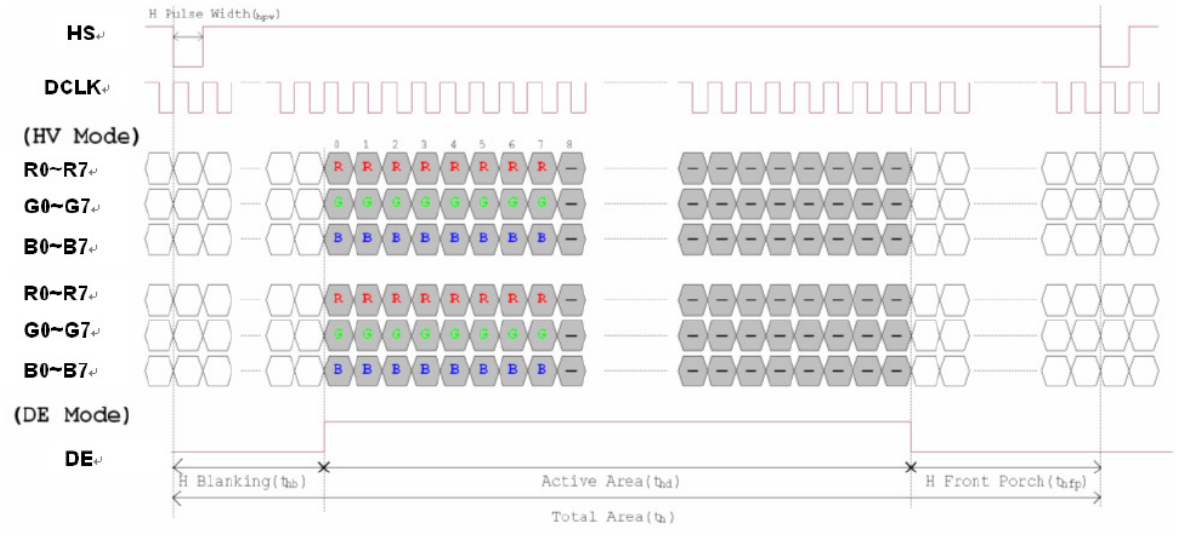
3.3 Timing Characteristics

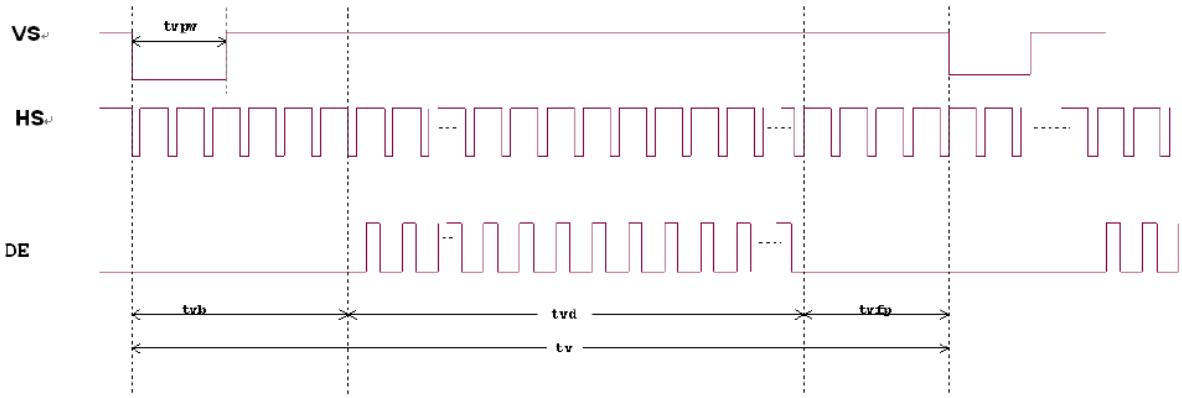


3.3.1 AC Electrical Characteristics

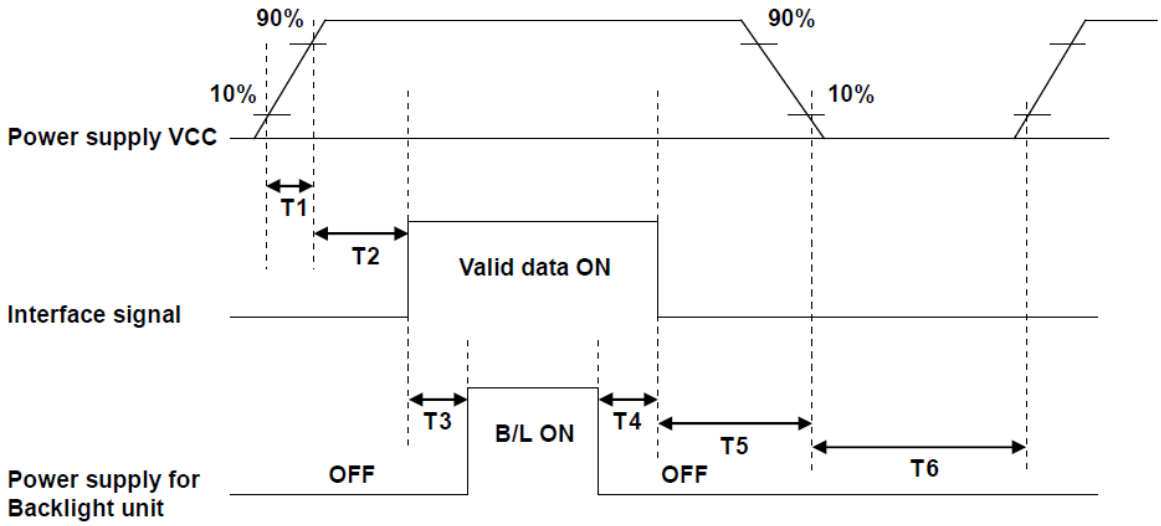
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	-	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{cph}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

3.3.2 Data input format





3.3.3. Power ON/OFF sequence



Parameter	SPEC.			Unit
	Min.	Typ.	Max.	
T1	1		2	ms
T2	200			ms
T3	180			ms
T4	180			ms
T5	200			ms
T6	1000			ms

3.3.4 Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	thd	-	800	-	DCLK	
DCLK Frequency	fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	th	862	1056	1200	DCLK	
HS pulse width	thpw	1	6	40	DCLK	
HS Blanking	thb	46	46	46	DCLK	
HS Front Porch	thfp	16	204	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	3	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

Note: Frame rate is 60±5Hz

3.3.5. LED Driver Condition

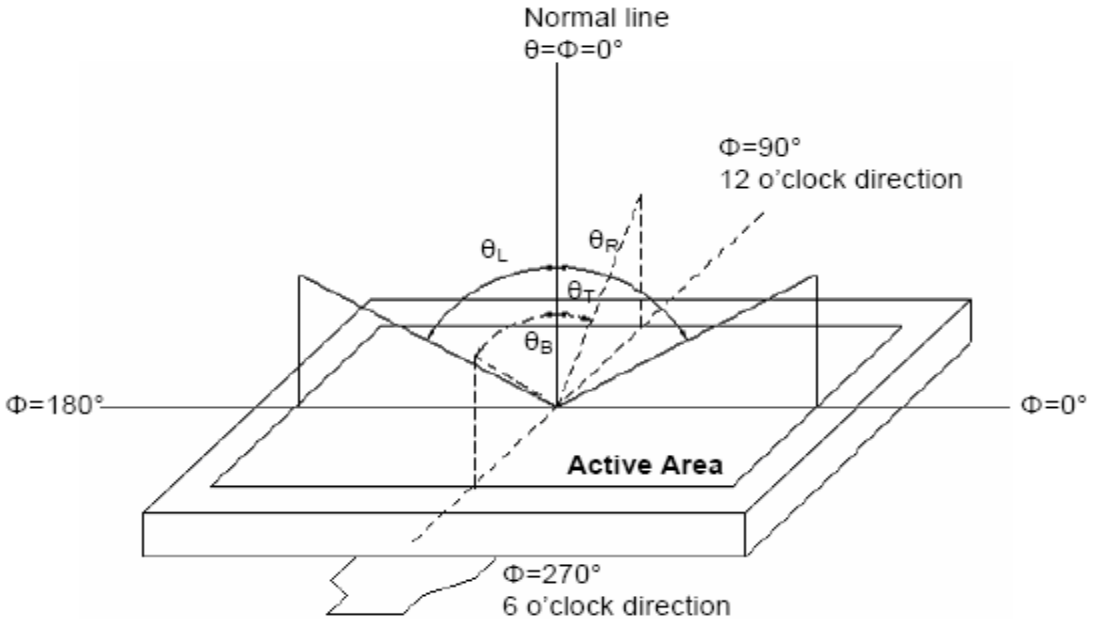
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remake
LED current	I_{LED}		100		mA	
LED voltage	V_{LED}		18		V	
LED lifetime	-	100,000		-	Hr	Note 1

Note 1. Brightness to be decreased to 50% of the initial value.

4. Optical Specifications

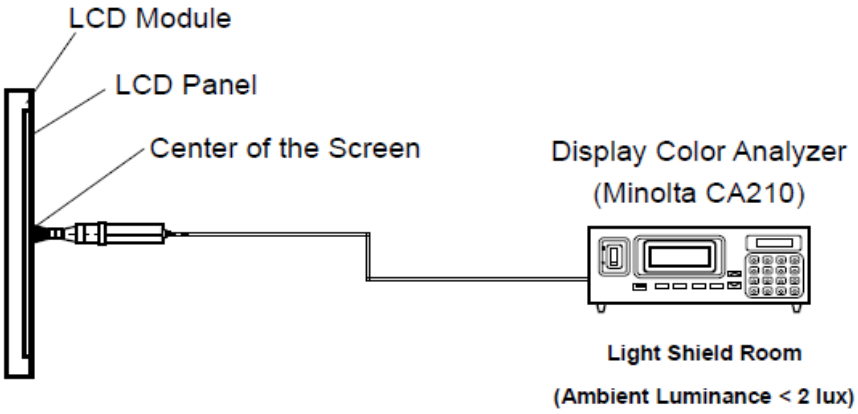
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Brightness		-	Viewing normal angle θ= ϕ =0	800	1000		Cd/m^2	Center of display
Response time		T_{on+off}			25	50	ms	Note 3,5
Contrast ratio		CR		700	1000			Note 4,5
Color Chromaticity	White	Wx		0.26	0.31	0.36		Note 2,6,7
		Wy		0.28	0.33	0.38		
Viewing angle	Hor.	θ R	CR≧10	60	70		Deg	Note 1
		θ L		60	70			
	Ver.	θ T		50	60			
		θ B		60	70			
Color saturation			NTSC		50		%	

Note 1 : Definition of viewing angle range



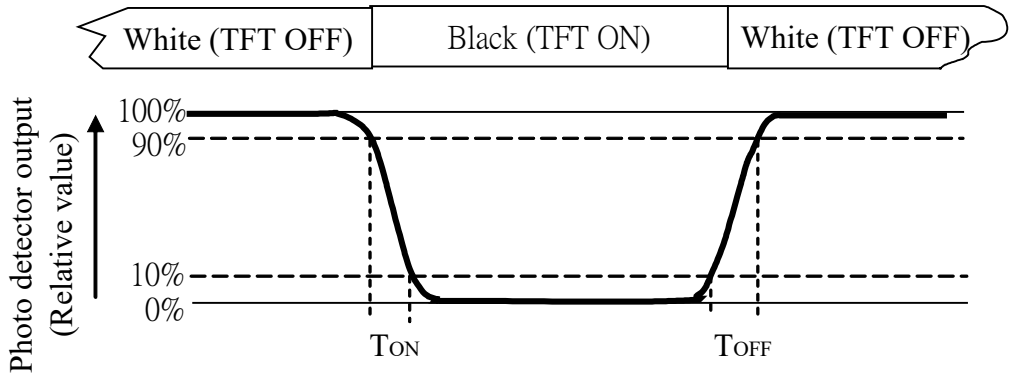
Note 2: Measurement method

The LCD module should be stabilized at given temperature for 0.5 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room



Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



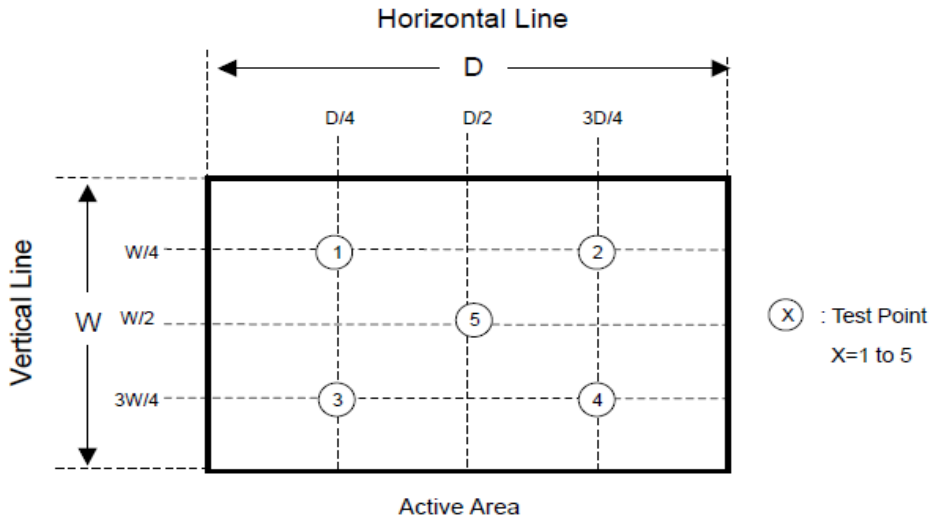
Note 4: Definition of Contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=220mA .

Note 7: Definition of Luminance Uniformity
Luminance uniformity of these 5 points is defined as below and measured by Minolta CA210



Uniformity = (Min. Luminance of 5 points) / (Max. Luminance of 5 points)

5. Reliability Test Items

Item	Test Conditions	Remark
High Temperature Storage	Ta = 80℃ 240hrs	
Low Temperature Storage	Ta = -30℃ 240hrs	
High Temperature Operation	Ts = 70℃ 240hrs	
Low Temperature Operation	Ta = -20℃ 240hrs	
Operate at High Temperature and Humidity	+60℃, 90%RH 240hrs	
Thermal Shock	-20ºC, 0.5hour←→70℃, 0.5hour; 100cycles	
Vibration Test	1.5G / 10-500 Hz, Sine wave, 30 min/cycle, 1cycle for each X, Y, Z	
Electro Static Discharge	150pF,330Ω,± 2KV(contact),	

**** Ta = ambient Temperature

6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

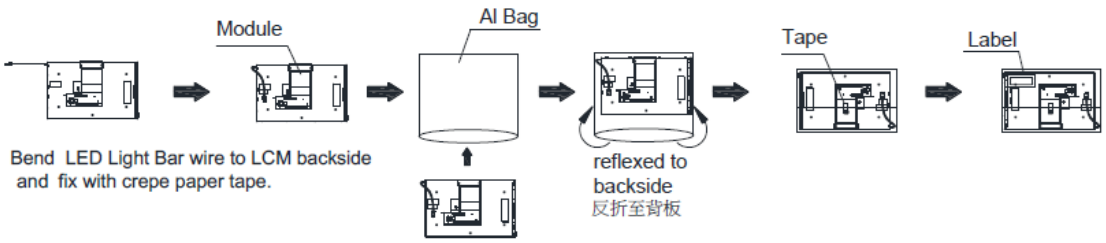
6.4. Storage

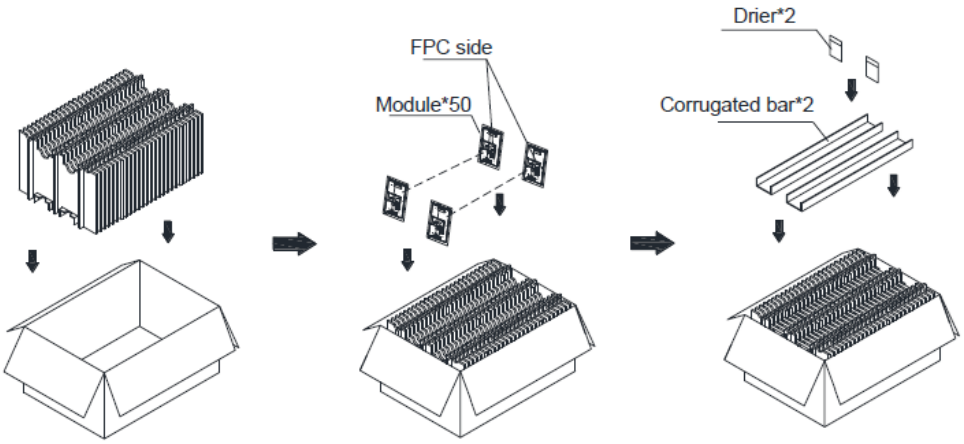
1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.

7. Package Information





(1) Carton Dimensions : 530(L)*367(W)*260(H)
(2) 50 Modules/Carton

7. Mechanical Drawing